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the same great division; *i. e.* buryers of the dead. Their war-like enemies compelled them to live in brush huts, built together in a wooded country in winter, and in the openings in summer; thus the mounds with human remains therein occur in these sections.

A difference in the kind of dwellings or tools do not of themselves warrant the conclusion of some writers that each distinctive class was an evidence of tribal or race difference. We might as well consider the makers of pottery a distinct people; but they were not, for every race of Indian made and used pottery in ancient times, and at the present time, even the warlike Indian, without fixed habitations, has his though of a plainer kind. There are some who think that the kind of pottery argues a different race origin; this is not so, the different qualities of pottery and forms are designed to suit the different purposes for which they were made, and not for a display of race distinctions. In Mexico and the United States in ancient times, the Indians used the same method of rendering their pottery hard and smooth as is now practiced by the Indians of Mexico to-day. A pebble of agate or jasper is used to rub over the surface of the pottery as soon as the new made article is dry; a fine, hard, smooth surface is the result; it has been considered a varnish. I saw it in general use; it is a new fact not known to writers before my visit to Mexico in 1877 and 1878.

In conclusion, I would say that there are two races of Indians to-day, as there were in ancient times, circumstances causing various interminglings, resulting in differences in manners and customs.

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EDITORS' TABLE.

EDITORS: A. S. PACKARD, JR., AND E. D. COPE.

—— Professor E. DuBois Raymond has recently delivered a lecture before the physicians of the German army, on exercise or use, in which he makes some important admissions. We hope to give an abstract of the lecture, but content ourselves, at present, with the following extracts: "We should be, therefore, free to admit, with some appearance of reason, that the vigor of the muscles of wings and of digging feet; the thick epidermis of the palm of the hand and of the sole of the foot; the callosities of the tail and of the ischia of some monkeys; the processes of bones for the insertion of muscles; are the consequences of nutritive and formative excitation, transmitted by heredity." In this position Professor Raymond is in strict accord with the American school of evolutionists. He then goes on to say: "It is necessary to admit along with development by use, development by natural selection, and that for three reasons. First, there are innumerable adaptations—I cite only those known as mimetic coloration—which appear to be only explicable by natural selection, and not by use. Second, plants which are, in their way, as well adapted to their environment as animals, are of course incapable of activity. Thirdly, we need the doctrine of natural selection to explain the origin of the capacity for exercise itself. Unless we admit that which it is impossible to do from a scientific standpoint, that designed structures have a mechanical origin, it is necessary to conclude that in the struggle for existence, the victory has been secured by those living beings who in exercising their natural functions have increased, by chance ("par hasard") their capacity for these functions more than others, and that the beings thus favored have transmitted their fortunate gifts, to be still further developed by their descendants." In these three propositions, Professor Raymond still clings to the obscurities of the Darwinians, though Darwin himself is not responsible for them.

To take up first the second and third of these propositions. Professor Raymond does not for the moment remember that movement (or use) is an attribute of all life in its simplest forms, and that the sessile types of life, both vegetable and animal, must, in view of the facts, be regarded as a condition of degeneration. It is scarcely to be doubted that the primordial types of vegetation were all free swimmers, and that their habit of building cellulose and starch, is responsible for their early-assumed stationary condition. Their protoplasm is still in motion in the limited confines of their walls of cellulose. The movements of primitive plants have doubtless modified their structure to the extent of their duration and scope, and probably laid slightly varied foundations on which automatic nutrition has built widely diverse results. We may attribute the *origin* of the forms of the vegetable kingdom to three kinds of motion which have acted in conjunction with the physical environment; first, their primordial free movements; second, the intracellular movements of protoplasm; third, the movements of insects, which have doubtless modified the structure of the floral organs. Of the forms thus produced, the fit have survived and the unfit have been lost, and that is what natural selection has had to do with it.

The *origin* of mimetic coloration, like many other things, is yet unknown. An orthodox Darwinian attributes it to "natural selection," which turns out, on analysis, to be "hasard." The *survival* of useful coloration is no doubt the result of natural selection.

But this cannot be confounded with the question of origin. On this point the Darwinian is on the same footing as the old time Creationist. The latter says God made the variations, and the Darwinian says that they came by chance. Between these positions science can perceive nothing to choose.—*C.*

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RECENT LITERATURE.

THE DEVELOPMENT OF AMPHIOXUS BY HATSCHEK.[1]—The entire organic world does not contain a more interesting animal than the lancelet, Amphioxus or Branchiostoma, the lowest vertebrate, the link which, though far removed from either, indicates a common origin, or at least a remarkable structural similarity between the Vertebrata and the Ascidians or Tunicates.

The literature upon this creature, extensive but incomplete, is now enriched by the present exhaustive memoir by one of the most careful and accurate of European biologists. In this memoir, which forms the greater portion of a late issue of the *Arbeiten* of the Zoölogical Institute of the University of Vienna, and is illustrated by nine large plates, carefully drawn and colored, the development of the lancelet is traced with the greatest minuteness from the ovum to the adult. The ovum of Amphioxus contains, between the germinal portion and the enclosing membrane a remarkably large water space, forming by far the greater portion of its bulk, and the cleavage is very near regular, the difference between the size of the cells separated by the first equatorial fissure being very small. The "blastula" stage with its large segmentation cavity, and the gradual formation of a "gastrula," are abundantly illustrated; two plates are devoted to the more advanced development, plainly showing the hollow structure and alternate position of the muscle-plates or myocommas, and three colored plates are filled with transverse sections.

Until an advanced period of embryonic life, the digestive tract is continuous with a dorsal canal, which terminates at an opening upon the upper surface of the head. At a later period the vent is formed, connection between the digestive tract and the dorsal canal is cut off, the anterior opening closes, and the dorsal canal becomes the neural canal.

The hollow form of the muscular segments is shared by the lancelet with the Selachians (sharks and rays), Cyclostomes (hags and lampreys) and Batrachia, and tends to prove their primary origin as diverticula from the digestive cavity.

In the notochord vacuoles are developed, which become larger,

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[1] *Studien über Entwickelung der Amphioxus.* Von B. HATSCHEK, pp. 88. 9 double 8vo plates. Arbeiten aus Zool. Inst. Univ. Wien und der Zool. Station in Triest. Tom IV. I Heft, 1881.